



07-22-05

DFW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:)	Examiner: Not Yet Assigned
)	Group Art Unit: 1614
Pakiza MOHAMMAD)	
)	Conf. No.: 8966
Serial No.: 10/821,154)	
)	
Filed: 04/07/2004)	Cust. No. 23589
)	
Title: COMPOSITION COMPRISING A)	
PHOSPHATE BINDER AND ITS PREPARATION)	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF CERTIFIED COPY

Attached please find the certified copy of the foreign application from which priority is claimed for this case:

Country: BELGIUM

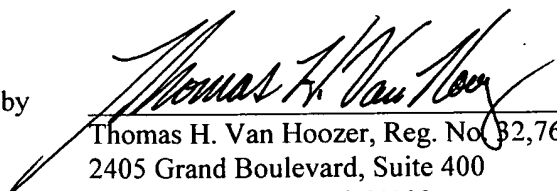
Application No.: PCT/BE03/00121

Filing Date: July 7, 2003

Respectfully submitted,

HOVEY WILLIAMS LLP

by

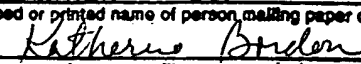

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2405 Grand Boulevard, Suite 400
Kansas City, Missouri 64108
(816) 474-9050
Customer No. 23589

ATTORNEYS FOR APPLICANT

(Docket No. 34866)

"Express Mail" mailing label No. EV59777 2905US

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I hereby certify that this paper or fee is being deposited
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KATHERINE GORDON
(Typed or printed name of person mailing paper or fee)

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ROYAUME DE BELGIQUE

MINISTRE DES AFFAIRES ECONOMIQUES
ADMINISTRATION DE LA POLITIQUE COMMERCIALE



Il est certifié que les annexes à la présente sont la copie fidèle de documents
que détient l'Office de la Propriété Industrielle.

Bruxelles, le 17. -5- 2004

Pour le Conseiller de l'Office
de la Propriété industrielle

Le fonctionnaire délégué,



BAILLEUX G.
Conseiller délégué

CERTIFIED COPY OF
PRIORITY DOCUMENT

BEST AVAILABLE COPY

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

PC T / B E 0 3 / 0 0 1 2 1
International Application No.

07 JUL 2003 (07 -07- 2003)
International Filing Date

RO/BE - PCT INTERNATIONAL APPLICATION

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) RP/PCT/03-12

Box No. I TITLE OF INVENTION Composition comprising a Phosphate binder and its preparation	
Box No. II APPLICANT <div style="float: right;"><input checked="" type="checkbox"/> This person is also inventor</div>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.) MOHAMMAD Pakiza 37 Avenue P. Vander Biest box 168 B-1150 Brussels Belgium	Telephone No. Facsimile No. Teleprinter No. Applicant's registration No. with the Office
State (that is, country) of nationality: BE	State (that is, country) of residence: BE
This person is applicant for the purposes of: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input checked="" type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box </div>	
Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)	This person is: <div style="margin-top: 5px;"> <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.) </div> Applicant's registration No. with the Office
State (that is, country) of nationality:	State (that is, country) of residence:
This person is applicant for the purposes of: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box </div>	
<input type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.	
Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE	
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: <div style="float: right;"> <input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative </div>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) Powis de Tenbossche Roland CABINET BEDE Boulevard Lambertmont 140 B-1030 Brussels Belgium	Telephone No. 003227790339 Facsimile No. 003227724780 Teleprinter No. Agent's registration No. with the Office
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.	

Sheet No. ...2...

Box No. V DESIGNATION OF STATES

Mark the applicable check-boxes below; at least one must be marked.

The following designations are hereby made under Rule 4.9(a):

Regional Patent

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZM Zambia, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT (if other kind of protection or treatment desired, specify on dotted line)
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, BG Bulgaria, CH & LI Switzerland and Liechtenstein, CY Cyprus, CZ Czech Republic, DE Germany, DK Denmark, EE Estonia, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, HU Hungary, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, RO Romania, SE Sweden, SI Slovenia, SK Slovakia, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> OM Oman |
| <input checked="" type="checkbox"/> AG Antigua and Barbuda | <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> PG Papua New Guinea |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> PH Philippines |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> KE Kenya | |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> SC Seychelles |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> KR Republic of Korea | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> KZ Kazakhstan | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> BZ Belize | <input checked="" type="checkbox"/> LC Saint Lucia | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> LK Sri Lanka | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> CH & LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> LR Liberia | <input checked="" type="checkbox"/> SY Syrian Arab Republic |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> LS Lesotho | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> CO Colombia | <input checked="" type="checkbox"/> LT Lithuania | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> LU Luxembourg | <input checked="" type="checkbox"/> TN Tunisia |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> LV Latvia | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> MA Morocco | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> MD Republic of Moldova | |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> MG Madagascar | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> DZ Algeria | <input checked="" type="checkbox"/> MN Mongolia | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> EC Ecuador | <input checked="" type="checkbox"/> MW Malawi | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> MX Mexico | |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> MZ Mozambique | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> NI Nicaragua | <input checked="" type="checkbox"/> VC Saint Vincent and the Grenadines |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> NO Norway | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> NZ New Zealand | <input checked="" type="checkbox"/> YU Serbia and Montenegro |
| <input checked="" type="checkbox"/> GE Georgia | | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> GH Ghana | | <input checked="" type="checkbox"/> ZM Zambia |
| <input checked="" type="checkbox"/> GM Gambia | | <input checked="" type="checkbox"/> ZW Zimbabwe |

Check-boxes below reserved for designating States which have become party to the PCT after issuance of this sheet:



Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Supplemental Box*If the Supplemental Box is not used, this sheet should not be included in the request.*

1. *If, in any of the Boxes, except Boxes Nos. VIII(i) to (v) for which a special continuation box is provided, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No." (indicate the number of the Box) and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:*
 - (i) *if more than two persons are to be indicated as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;*
 - (ii) *if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;*
 - (iii) *if, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;*
 - (iv) *if, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;* continuation of Box IV
further agent

F de Kemmeter
Ph Overath
 - (v) *if, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent of addition," or "certificate of addition," or if, in Box No. V, the name of the United States of America is accompanied by an indication "continuation" or "continuation-in-part": in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application;*
 - (vi) *if, in Box No. VI, there are more than five earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI.*
2. *If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.*

Sheet No. 4

Box No. VI PRIORITY CLAIM

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country or Member of WTO	regional application:* regional Office	international application: receiving Office
item (1)				
item (2)				
item (3)				
item (4)				
item (5)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office) identified above as:

☐ all items
 ☐ item (1)
 ☐ item (2)
 ☐ item (3)
 ☐ item (4)
 ☐ item (5)
 ☐ other, see Supplemental Box

* Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA /

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year) Number Country (or regional Office)

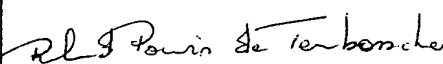
Box No. VIII DECLARATIONS

The following declarations are contained in Boxes Nos. VIII (i) to (v) (mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):

Number of
declarations

- | | | |
|---|--|---|
| <input type="checkbox"/> Box No. VIII (i) | Declaration as to the identity of the inventor | : |
| <input type="checkbox"/> Box No. VIII (ii) | Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent | : |
| <input type="checkbox"/> Box No. VIII (iii) | Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application | : |
| <input type="checkbox"/> Box No. VIII (iv) | Declaration of inventorship (only for the purposes of the designation of the United States of America) | : |
| <input type="checkbox"/> Box No. VIII (v) | Declaration as to non-prejudicial disclosures or exceptions to lack of novelty | : |

Sheet No. 5

Box No. IX CHECK LIST; LANGUAGE OF FILING		
<p>This international application contains:</p> <p>(a) in paper form, the following number of sheets:</p> <p style="margin-left: 20px;">request (including declaration sheets) : 5</p> <p style="margin-left: 20px;">description (excluding sequence listings and/or tables related thereto) : 16</p> <p style="margin-left: 20px;">claims : 5</p> <p style="margin-left: 20px;">abstract : 1</p> <p style="margin-left: 20px;">drawings : _____</p> <p style="margin-left: 20px;">Sub-total number of sheets : 27</p> <p style="margin-left: 20px;">sequence listings : _____</p> <p style="margin-left: 20px;">tables related thereto : _____</p> <p style="margin-left: 20px;">(for both, actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (c) below)</p> <p style="margin-left: 20px;">Total number of sheets : 27</p> <p>(b) <input type="checkbox"/> only in computer readable form (Section 801(a)(i))</p> <p style="margin-left: 20px;">(i) <input type="checkbox"/> sequence listings</p> <p style="margin-left: 20px;">(ii) <input type="checkbox"/> tables related thereto</p> <p>(c) <input type="checkbox"/> also in computer readable form (Section 801(a)(ii))</p> <p style="margin-left: 20px;">(i) <input type="checkbox"/> sequence listings</p> <p style="margin-left: 20px;">(ii) <input type="checkbox"/> tables related thereto</p> <p>Type and number of carriers (diskette, CD-ROM, CD-R or other) on which are contained the</p> <p style="margin-left: 20px;"><input type="checkbox"/> sequence listings: _____</p> <p style="margin-left: 20px;"><input type="checkbox"/> tables related thereto: _____</p> <p style="margin-left: 20px;">(additional copies to be indicated under items 9(ii) and/or 10(ii), in right column)</p>	<p>This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item):</p> <p>1. <input checked="" type="checkbox"/> fee calculation sheet : 1</p> <p>2. <input type="checkbox"/> original separate power of attorney : _____</p> <p>3. <input type="checkbox"/> original general power of attorney : _____</p> <p>4. <input type="checkbox"/> copy of general power of attorney; reference number, if any: _____</p> <p>5. <input type="checkbox"/> statement explaining lack of signature : _____</p> <p>6. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): _____</p> <p>7. <input type="checkbox"/> translation of international application into (language): _____</p> <p>8. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material : _____</p> <p>9. <input type="checkbox"/> sequence listings in computer readable form (indicate type and number of carriers)</p> <p style="margin-left: 20px;">(i) <input type="checkbox"/> copy submitted for the purposes of international search under Rule 13ter only (and not as part of the international application) : _____</p> <p style="margin-left: 20px;">(ii) <input type="checkbox"/> (only where check-box (b)(i) or (c)(i) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Rule 13ter : _____</p> <p style="margin-left: 20px;">(iii) <input type="checkbox"/> together with relevant statement as to the identity of the copy or copies with the sequence listings mentioned in left column : _____</p> <p>10. <input type="checkbox"/> tables in computer readable form related to sequence listings (indicate type and number of carriers)</p> <p style="margin-left: 20px;">(i) <input type="checkbox"/> copy submitted for the purposes of international search under Section 802(b-quater) only (and not as part of the international application) : _____</p> <p style="margin-left: 20px;">(ii) <input type="checkbox"/> (only where check-box (b)(ii) or (c)(ii) is marked in left column) additional copies including, where applicable, the copy for the purposes of international search under Section 802(b-quater) : _____</p> <p style="margin-left: 20px;">(iii) <input type="checkbox"/> together with relevant statement as to the identity of the copy or copies with the tables mentioned in left column : _____</p> <p>11. <input type="checkbox"/> other (specify): _____</p>	<p>Number of items</p>
Figure of the drawings which should accompany the abstract:	Language of filing of the international application: English	
<p>Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE</p> <p><i>Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).</i></p> <p>July 7, 2003</p> <p></p> <p>Roland Powis de Tenbosche</p>		

For receiving Office use only		
1. Date of actual receipt of the purported international application:	07 JUL 2003 (07-07-2003)	2. Drawings:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		<input type="checkbox"/> received:
4. Date of timely receipt of the required corrections under PCT Article 11(2):		<input type="checkbox"/> not received:
5. International Searching Authority (if two or more are competent): ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid	

For International Bureau use only
Date of receipt of the record copy by the International Bureau:

PATENT COOPERATION TREATY

From the RECEIVING OFFICE

To:

OFFICE EUROP. DES BREVETS
Division PCT

Patentlaan 2 Postbus 5818
2280 HV Rijswijk
NEDERLAND

PCT

NOTIFICATION CONCERNING
DOCUMENTS TRANSMITTED

Date of mailing
(day/month/year)

The receiving Office transmits herewith the following documents:

(number)

1. ☐ _____ record copies (Article 12(1)).
2. ☒ 1 _____ search copies (Article 12(1)).
3. ☐ _____ translations of international applications (Rule 12.3 or 12.4)
4. ☐ _____ copies of purported international applications (Rule 20.7(iv)).
5. ☐ _____ record copies and corrections not already transmitted in respect of the international applications which have been considered withdrawn (Rule 29.1(a)(i)).
6. ☐ _____ (copies of the) letters of corrections or rectifications (Administrative Instructions, Section 325(b) and (c)).
7. ☐ _____ (copies of) replacement sheets (Administrative Instructions, Section 325(b) and (c)).
8. ☐ _____ (copies of) later submitted sheets (Administrative Instructions, Section 309(b)(iii), (c)(ii)).
9. ☐ _____ (copies of) later submitted drawings (Administrative Instructions, Section 310(c)(iii), (d)(ii)).
10. ☒ _____ other documents (*specify*): RO/105
1 letter of the patent agent
1 power

- ☒ The Annex contains a list identifying each document transmitted by the type of document it is, the corresponding international application number and, if necessary, other information.

This notification is sent to the addressee in its capacity as:

- ☒ the International Searching Authority
- ☐ the International Bureau

Name and mailing address of the receiving Office

OPRI / Bruxelles

Facsimile No.

Authorized officer Harnegnies N.

Telephone No. 32-2-206.48.36

ANNEX TO FORM PCT/RO/118

Type of document	International application No.	Other information
request description conclusions abstract RO/105 1 letter of the patent agent 1 power	PCT/BE03/00121	MOHAMMAD Pakiza

ANNEX TO FORM PCT/RO/118

Type of document	International application No.	Other information
request description conclusions abstract RO/105 1 letter of the patent agent 1 power	PCT/BE03/00121	MOHAMMAD Pakiza

ANNEX TO FORM PCT/RO/118

Type of document	International application No.	Other information
request description conclusions abstract RO/105 1 letter of the patent agent 1 power.	PCT/BE03/00121	MOHAMMAD Pakiza

From the RECEIVING OFFICE

To:

POWIS DE TENBOSSCHE Roland
Cabinet BEDE
Bld Lambermont 140
1030 Bruxelles

PCT

NOTIFICATION OF THE INTERNATIONAL
APPLICATION NUMBER AND OF THE
INTERNATIONAL FILING DATE

(PCT Rule 20.5(c))

Date of mailing
(day/month/year)

09.07.2003

Applicant's or agent's file reference
RP/PCT/03-12

IMPORTANT NOTIFICATION

International application No.
PCT/BE03/00121

International filing date (day/month/year)
07 July 2003 (07.07.03)

Priority date (day/month/year)

Applicant
MOHAMMAD Pakiza

Title of the invention
Composition comprising a Phosphate binder and its preparation.

1. The applicant is hereby notified that the international application has been accorded the international application number and the international filing date indicated above.

2. The applicant is further notified that the record copy of the international application:

- ☐ was transmitted to the International Bureau on _____
- ☒ has not yet been transmitted to the International Bureau for the reason indicated below and a copy of this notification has been sent to the International Bureau*:

☒ because the necessary national security clearance has not yet been obtained.

☐ because (reason to be specified):

* The International Bureau monitors the transmittal of the record copy by the receiving Office and will notify the applicant (with Form PCT/IB/301) of its receipt. Should the record copy not have been received by the expiration of 14 months from the priority date, the International Bureau will notify the applicant (Rule 22.1(c)).

Name and mailing address of the receiving Office

OPRI / Bruxelles

Authorized officer Harnegnies N.

Facsimile No.

Telephone No. 02/206.48.36

August 6, 2003

O.P.R.I.

NG III
Boulevard du Roi Albert II, 16
B-1000 BRUXELLES

For the attn. of Mrs. N. Harmegnies

Y/Ref. :

O/Ref. : RP/PCT/03-12

Dear Madam,

Re : International application No **PCT/BE03/00121**
filed July 7, 2003
in the name of MOHAMMAD Pakiza

Further to your invitation to correct defect dated July 9, 2003 and in order to complete this file we enclose :

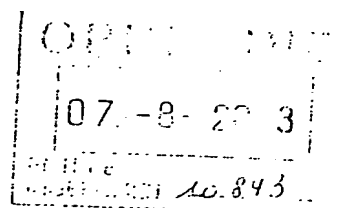
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hereby appoints (appoint) the following person as:

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Name and address

(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

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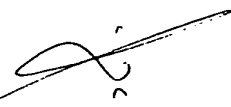
Title of the invention: composition comprising a Phosphate binder and its preparation

Applicant's or agent's file reference: RP/PCT/03-12

International application number (if already available): PCT/BE03/00121

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 MOHAMMAD PAKIZA

Date:

8-7-2003

Composition comprising a Phosphate binder and its preparation

5 The present invention relates to a composition comprising an inorganic binder, most precisely to an inorganic phosphate binder.

Inorganic phosphate binder have already been proposed in the past.

10 For example in a previous patent application WO9903797 in the name of Metal Chemical and Haji Anas, a polymeric matrix is disclosed, said matrix comprising a binder formed by mixing an alkali metal silicate aqueous solution with a powder comprising silico-aluminous reactive raw materials. A polymerization time of more than one hour is however necessary for reaching a sufficient hardening of the
15 matrix.

It has also been proposed in US 6,139,619 to form a binder by mixing a water soluble silicate with a water soluble amorphous inorganic phosphate glass in an aqueous medium. The hardening of the binder requires the removal of water by a
20 heat treatment.

In US 4,375,551, an acid solution is prepared by mixing $\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ with phosphoric acid, said acid solution being then mixed with calcium silicate. The so obtained binder has after hardening poor mechanical strength.

25

In the composition of the invention, the binder used is advantageously the binder as disclosed in WO 03/031366 of Applicant, the content of which is incorporated in the present specification by reference.

The binder of WO 03/031366 can be sufficiently hardened within a term of less
30 than 10 minutes and which has excellent mechanical properties.

As stated in said document, the binder can be mixed with various fillers.

It has now been observed that by using specific filler, especially a combination of specific filler, it was possible to increase mechanical properties of the mixture binder/filler(s) and/or the final appearance of the composition after its hardening and/or the fire resistance of the composition. For example, it was observed that swelling of the product could be prevented after a water absorption.

The present invention relates thus to an improvement of the inorganic binder of Applicant previous application WO 03/031366, which is characterized by calcium silicate sites which are connected the one with the other by alumina-silica phosphate bounds.

The invention relates to a composition comprising at least :

- an inorganic binder having calcium silicate sites which are connected the one with the other by alumina-silica phosphate bounds, the calcium silicate sites acting as cross-linking sites for alumina-silica phosphate bounds with a weight ratio Al_2O_3/SiO_2 ranging advantageously from 0.3 :1 and 10 :1, preferably from 0.6 :1 and 6 :1, and
- silicon containing fibers with a length of less than 1000 μm , the weight content of silicon containing fibers with a length of less than 1000 μm in the composition after its hardening and after removal of the possible free water being of at least 0.5% (i.e. a dry weight content).

It has been observed that the presence of at least 0.5 % by weight, preferably at least 1% by weight of silicon containing fibers, advantageously silicon containing fibers non reactive with the binder or substantially non reactive with the binder, it was possible to prevent the formation of any cracks at the surface of the hardened composition, as well as advantageously in the body of the hardened composition, even if the hardened composition has a high thickness, such as a thickness of more than 2mm, advantageously of more than 5mm, such as a thickness comprised between 10mm and 50mm.

Advantageously, the composition comprises silicon containing fibers with an average (in weight) length of less than 500 μm , the weight content of silicon

containing fibers with an average length of less than 500 μ m in the composition after its hardening and after removal of the possible free water (free water is water present in the composition, such as in the hardened composition, but which can be removed in a drying step at a temperature of 100°C) being of at least 0.5% (i.e. a
5 dry weight content).

According to a preferred embodiment, the composition comprises silicon containing fibers with an average (in weight) length of more than 10 μ m, advantageously of more than 20 μ m, preferably comprised between 25 μ m and
10 300 μ m, most preferably between 50 μ m and 250 μ m.

According to an advantageous embodiment, the silicon containing fibers with a length of less than 1000 μ m, advantageously with an average (in weight) length of less than 500 μ m, are substantially not reactive with the binder, preferably not
15 reactive with the binder, i.e. acting as a pure filler. Substantially not reactive silicon containing fibers are fibers characterized in that less than 10% by weight, advantageously less than 5% by weight, preferably less than 1% by weight, most preferably less than 0.5% by weight, of the silicon containing fibers is chemically reacted with the binder, for making for example one or more chemical bounds
20 between fibers and the binder.

According to embodiments, after hardening and removal of free water, the composition comprises from 1% up to 75% by weight, advantageously from 2% up to 25% by weight, silicon containing fibers with a length of less than 1000 μ m,
25 advantageously with an average (in weight) length of less than 500 μ m.

Silica containing fibers are for example natural fibers, possibly treated, synthetic fibers, mineral fibers, and mixtures thereof. Natural fibers are preferred, such as wood fiber, straw fiber, rice husk or bran fibers, mixtures thereof. The natural
30 fibers are advantageously heat treated, for example at temperature higher than 400°C, such as at a temperature higher than 700°C or 800°C, advantageously in an atmosphere rich in Nitrogen or in a nitrogen atmosphere. Said heat treatment is

preferably carried after a drying step. Rice bran or rice husk are preferred silica containing fibers used in the composition of the invention, said fibers being advantageously defatted and dried. When said fibers are burned and carbonized in a nitrogen gas rice bran ceramic fiber are produced. Possibly some phenolic resin is added to the rice bran or rice husk before the carbonizing and burning step. Possibly the phenolic resin can be mixed with rice bran so as to prepare or form rice bran containing fibers or filaments, the latter fibers or filament after drying being carbonized and burnt (for example at a temperature of 300 to 1100°C during a time sufficient for the formation of ceramics). The silica containing fibers are advantageously ceramic silica containing fibers. Such fibers, especially rice bran ceramic fibers, have a high strength, a high hardness, a low density, a low friction (hereby the fibers can easily flow the one with respect to the other, whereby facilitating the mixing step).

According to a preferred embodiment, the composition further comprises silica flour with a particle size of less than 500µm, advantageously comprised between 2 and 400µm, the weight content of silica flour in the composition after its hardening and after removal of the possible free water being of at least 0.5%. Said silica flour content is advantageously comprised between 1 and 10% by weight of the composition after its hardening and removal of free water (water which can be removed with a heating step at a temperature of 100°C) (i.e. a dry weight content).

Preferably, the composition comprises silica flour with an average (in weight) particle size comprised between 2 and 100µm, advantageously between 5 and 60µm, preferably between 10 and 50µm, the weight content of silica flour in the composition after its hardening and after removal of the possible free water being comprised between 1 and 10%, advantageously between 2 and 8%.

According to a more specific embodiment, the composition with or without (advantageously with) silica flour further comprises crystallized alumina silicate particles which are substantially not reactive with the binder and which have an average (in weight) particle size comprised between 5 and 100µm, the weight

content of crystallized alumina silicate in the composition after its hardening and after removal of the possible free water being comprised between 1 and 10%, advantageously between 2 and 8%.

- 5 According to an advantageous embodiment, the weight ratio calcium silicate site / SiO_2 present in the alumina-silica phosphate bonds is greater than 1, preferably greater than 1.5.

Advantageously, the calcium silicate sites are calcium meta silicate sites having a
10 substantially acicular nature with a length/diameter ratio from 2/1 to 50/1, advantageously from 3/1 to 20/1.

Preferably, the calcium meta silicate sites has an average length (average in weight) from $10\mu\text{m}$ to 10mm , advantageously from $50\mu\text{m}$ to 5mm , such as $100\mu\text{m}$,
15 $300\mu\text{m}$, $500\mu\text{m}$.

The calcium silicate sites act preferably as cross-linking sites for alumina-silica phosphate bounds.

- 20 According to an embodiment, the alumina-silica phosphate bounds have a ratio $\text{Al}_2\text{O}_3/\text{SiO}_2$ ranging from 0.3 : 1 and 10 : 1, advantageously from 0.6 : 1 and 6 : 1.

According to an advantageously embodiment, the weight ratio calcium silicate sites/alumina-silica phosphate bounds is comprised between 0.1 and 1.1,
25 advantageously between 0.3 and 0.9, preferably between 0.4 and 0.7.

The composition of the invention can also comprise one or more further filler(s) and/or reinforced materials.

- 30 The invention relates also to a product made at least partly or associated at least partly to a hardened composition of the invention, as disclosed here above. For example the product can be a support provided with a coating layer with a

thickness for example of 1 to 10mm, or even more. The product can also have the form of a laminated product, an inner layer being made from a composition of the invention, said inner layer having for example a thickness of 5mm up to 100mm, or even more.

5

A further object of the invention is a kit for the preparation of a composition according to the invention, said kit comprising :

- 10 - a container of bag containing a water insoluble calcium silicate, silicon containing fibers with a length of less than 1000 μ m, and possibly, but advantageously also silica flour with an average particle size of less than 500 μ m, and
- one or more containers or bags containing compounds for preparing an acid alumina-silica phosphate solution or containing an alumina-silica phosphate
15 solution, the pH of said solution measured at 20°C being less than 1.5, advantageously less than 1, preferably less than 0.5, in which the silica is solubilized .

It has been observed that the premix of water insoluble calcium silicate with silicon containing fibers with a length of less than 1000 μ m was in a form enabling an
20 easily and quick mixing with an acid alumina-silica phosphate solution.

The water insoluble calcium silicate, the silicon containing fibers, the silica flour used in the kit has advantageously one or more characteristics as disclosed here above in the composition of the invention.

25 The alumina-silica phosphate solution has advantageously a weight ratio Al_2O_3/SiO_2 ranging from 0.3 : 1 and 10 : 1, preferably from 0.6 : 1 and 6 : 1.

The invention further relates to a process for the preparation of a composition according to the invention, in which a binding mixture is prepared by mixing water
30 insoluble calcium silicate particles with an acid alumina-silica phosphate solution at a temperature lower than 50°C, said acid alumina-silica phosphate solution comprising solubilized SiO_2 and having a pH less than 2, advantageously less than

1.5, preferably comprised between 0.5 and 1.5, said alumina-silica phosphate solution having a weight ratio $\text{Al}_2\text{O}_3/\text{SiO}_2$ ranging advantageously from 0.3 : 1 and 10 : 1, preferably from 0.6 : 1 and 6 : 1, in which silicon containing fibers with a length of less than 1000 μm are mixed with water insoluble calcium silicate particles, prior to or during the mixing of water insoluble silicate particles with an acid alumina-silica phosphate solution and/or in which silicon containing fibers with a length of less than 1000 μm are mixed with the binding mixture before its complete hardening.

Preferably, the binding mixture is first prepared and then the silicon containing fibers are added. Said addition is carried out when the binding mixture is still sufficiently liquid or pourable by gravity. Possibly before and/or during the addition of the fibers, water can be added for controlling the viscosity. Possibly the silicon containing fibers are prewetted before being added to the binding mixture.

According to an advantageous embodiment, silica flour is added to the water insoluble calcium silicate particles, prior to or during the mixing of water insoluble silicate particles with an acid alumina-silica phosphate solution and/or to the binding mixture before its complete hardening, said addition being carried out prior, during or after the addition of silicon containing fibers.

Preferably, the silicon containing fibers and the silica flour are premixed before being added to the acid alumina-silica phosphate solution or to the binding mixture. According to a possible embodiment, the insoluble calcium silicate particles, the silicon containing fibers and the silica flour are premixed before being added to and mixed with the acid alumina-silica phosphate solution.

Advantageously, the weight ratio water insoluble calcium silicate particles / solubilized SiO_2 present in the alumina-silica phosphate solution is greater than 1, preferably greater than 1.5.

Preferably, the hardening of the binder is carried out at a temperature comprised between 0°C and 50°C, such as advantageously between 10 and 30°C.

The composition is preferably hardened under pressure, such as under a pressure comprised between $2 \cdot 10^5$ Pa and $100 \cdot 10^5$ Pa, for example $5 \cdot 10^5$ Pa, 10^6 Pa, $2 \cdot 10^6$ Pa, etc..

5 The amount of calcium silicate added to the acid silica alumina phosphate solution is advantageously such that the weight ratio calcium silicate / SiO_2 present in the acid solution is comprised between 1 and 5, advantageously comprised between 1.5 and 3.5.

10 Preferably, the amount of calcium silicate added to the acid silica alumina phosphate solution is such that the weight ratio calcium silicate / SiO_2 present in the acid solution is greater than 2.

According to a preferred embodiment, the silica used for the preparation of the acid
15 silica alumina phosphate solution is precipitated silica.

The acid alumina-silica solution before its mixing with insoluble calcium silicate particles has advantageously a pH of less than 2, preferably less than 1.5, for example comprised between 0.1 and 1.5, preferably comprised between 0.5 and
20 1.5. The acid pH is advantageously obtained by using phosphoric acid or an acid mixture containing at least phosphoric acid. Preferably, substantially only phosphoric acid is used as mineral acid, most preferably as acid for lowering the pH of the solution to less than 2.

25 The calcium silicate particles are advantageously calcium meta silicate particles having a substantially acicular nature with a length/diameter ratio from 2/1 to 50/1, advantageously from 3/1 to 20/1.

The calcium meta silicate particles have preferably an average length from $10\mu\text{m}$ to
30 10mm , advantageously from $50\mu\text{m}$ to 5mm .

According to a preferred embodiment, the calcium silicate particles act as cross-linking sites for alumina-silica phosphate bounds. It seems also that the presence of insoluble calcium silicate particles catalyzes the formation of alumina-silica phosphate bounds.

5

In the process of the invention, the alumina-silica phosphate solution has advantageously a weight ratio $\text{Al}_2\text{O}_3/\text{SiO}_2$ ranging from 0.3 :1 and 10 :1, preferably from 0.6 :1 and 6 :1.

- 10 For example, the weight ratio calcium silicate particles/alumina-silica phosphate solution is comprised between 0.1 and 1.1, preferably from 0.3 and 0.9, most preferably between 0.4 and 0.7.

In the process of the invention, various filler and/or a reinforced material can be
15 mixed with the calcium silicate particles before being mixed with the acid alumina-silica phosphate solution, and/or a filler and/or a reinforced material is mixed to the mixture calcium silicate/alumina - silica phosphate solution, before its or during its hardening.

- 20 Examples of fillers or reinforced materials which can be mixed with the binder before its preparation, during its preparation, before its hardening or during its hardening are :

- waste materials, such as finely divided waste material, for example fuel ashes, fly ashes, buildings waste materials, etc.
- 25 - flake-like materials such as mica, etc.,
- silica sand, silica flour,
- coloring agents or materials, such as inorganic coloring agents, pigments, etc.
- cellulose and/or protein base fibers, such as natural fibers, flax, chip, straw, hemp, wool fibers, etc.
- 30 - synthetic fibers, such as organic synthetic fibers, inorganic synthetic fibers, such as polyesters, polypropylene, glass and ceramic fibers, etc.

- natural and synthetic organic base waste materials, such as saw dust, rice husk, straw and recycled organic waste,
- natural fibers of mineral origin,
- natural material, possibly treated (for example heat treated), such as perlite,
- 5 vermiculite, etc.
- etc.

Additives can be added to the binder before its preparation, during its preparation, before its hardening or during its hardening, such additives are for example :

- 10 - foaming agents, such as water peroxide, organic peroxide, etc.
- viscosity regulating agent, such as superplasticizer
- material for improving the impermeability or the water repulsion such as lignosulfonates and silica fume
- etc.

15

The binder of the invention is prepared by using an acid alumina-silica phosphate solution, said solution is advantageously prepared by reacting aluminum oxide powder (size advantageously lower than 50 μ m, preferably lower than 30 μ m, for example from 5 to 25 μ m) with a purity of more than 95%, preferably more than

20 99%, silica powder (size advantageously lower than 50 μ m, preferably lower than 30 μ m, for example from 10 to 25 μ m) with a purity of more than 95%, preferably of more than 99%, and phosphoric acid as an aqueous phosphoric acid or in presence of an aqueous medium. The phosphoric acid has preferably a purity of more than 95%, most preferably of more than 99%. Phosphoric acid is available in

25 various concentration. Preferably, the phosphoric acid will be a phosphoric aqueous solution with a phosphoric acid concentration of more than 75%, preferably of more than 85%. Preferably, the silica powder is first mixed with the phosphoric acid and then the alumina particles are added.

- 30 The acid alumina-silica phosphate solution contains possibly some other acids, such as organic acid, strong mineral acid, etc, however, in this case, the content of

such acid will preferably be less than 10% of the phosphoric acid content of the solution.

Instead of using aluminum oxide, it is possible to use aluminum phosphate,
5 aluminum hydroxide, etc. However, aluminum oxide is preferred.

Instead of using silica, preferably precipitated silica particles, it is possible to use waste material issuing from glass bottles.

10 Possibly the aqueous phosphoric acid solution contains other solvents, such as alcohol, etc.

When a foamed product is desired, more water or solvent will be used for decreasing as much as possible the viscosity. It is also possible to obtain a foaming product by applying the acid composition on a base containing support or on an
15 alkaline support.

The acid alumina silica phosphate solution has advantageously a pH lower than 2, preferably lower than 1.

20 It has been observed that when using silica particles for the preparation of the acid alumina phosphate solution with a pH lower than 2, most preferably lower than 1, the dissolution of alumina particles was improved. The presence of solubilized SiO_2 in the acid solution was also improving the formation of the bounds when adding the water insoluble calcium silicate particles. Even, if some calcium silicate
25 particles are solubilized due to the low pH, some calcium silicate particles remains insoluble, due for example to the increase of pH to a value comprised between 3 and 6.

The binder of the invention is suitable for preparing product having a light weight
30 (such a weight from 70 to 140 kg/m^3) or a heavy weight (such as weight of 2,000 kg/m^3 or even more).

Products of the invention have high mechanical properties, such as one or more of the following properties (preferably several of said properties) : compression strength of more than 40N/mm², bending strength of more than 10 N/mm², very low heat of combustion (less than 500 KJ/kg, advantageously less than 100 KJ/kg, method used : ASTM D 2015 and BS EN ISO 1716), a high modulus of rupture (such as more than 10 MPa, for example between 12 and 20 MPa, method of analysis : NBN EN 196-1), a high compressive strength (more than 50 MPa, such as from 70 to 100 MPa, method of analysis : NBN EN 196-1), a high Young's modulus (more than 5000MPa, such as between 8000 and 15000MPa, method of analysis : NBN EN 196-1), absence o swelling even for water absorption from 10% up to 30% depending of the porosity, etc.

Products of the invention can be used as insulating materials (as panels, sheets, granules, etc), fire protection material, heat protection material, chemical protection material, buildings material (such as bricks, concrete, etc.), for making molds, shaping, casting and moldings products, tiles, roofing sheet, coating layers, inner layer, laminated products, etc.

Details and characteristics of the invention will appear from the description of the following examples.

In said examples, the following products have been used :

WATER : water with a low calcium/magnesium content (less than 100 ppm)

25

SiO₂ : precipitated SiO₂ particles with an average size of 10-15µm – purity of 99%

Al₂O₃ : powder with an average particle size of 10-15 µm – purity of 99%

30 Phosphoric acid : aqueous solution containing 90% phosphoric acid

Calcium silicate : calcium meta silicate powder, water insoluble, acicular nature, length of 1 mm, diameter 100 μ m.

5 Rice Husk fibers (RHF1): dried natural fibers (water content less than 2%) with an average (in weight) length of about 100 μ m.

Rice Husk fibers (RHF2): dried natural fibers (water content less than 2%) with an average (in weight) length of about 200 μ m.

10 Rice bran ceramic fiber (RBCF1) : defatted bran mixed with phenolic resin, shaped in filament, dried and carbonized and burnt under nitrogen atmosphere at 800°C, the fibers having a length of about 100 μ m.

15 Rice bran ceramic particles (RBC) : defatted bran mixed with phenolic resin, powdered, dried and carbonized and burnt under nitrogen atmosphere at 800°C, the powder having an average particle size (average in weight) of about 50 μ m.

Crystallized alumina silicate (CAS) : not reactive with the phosphate solution, the particles having an average particle size of 50 μ m (average in weight).

20

Silica Flour (SF) : average (in weight) particle size of about 30 μ m

Silica fume (Sf) : average (in weight) particle size 50 μ m.

25 Examples of Binders

The binders have been prepared by adding SiO₂ particles to phosphoric acid. After dissolution of the SiO₂ particles, Al₂O₃ particles were added. An acid alumina silica phosphate aqueous solution was so prepared. The pH of said acid solution
30 was then measured at 20°C. Possibly some water was added.

To said acid solution, calcium silicate particles was added. 5 to 10 minutes after the addition of calcium silicate particles, the binder can be hardened. Said hardening can be made at room temperature. In order to control the viscosity of the mixture, water can be added.

5

The following table gives the composition of the binders prepared.

Binder	1	2	3	4	5	6	7	8	9	10
SiO ₂ (g)	35	16	21	13.6	46.2	60	182	130.8	97.2	233
Al ₂ O ₃ (g)	24	23	13	50.8	30.8	60	136.5	21.8	58.1	46.6
Phosphoric acid (g)	141	141	167	123	135.6	180	182	87.4	184.7	350.4
Molar Ratio SiO ₂ /P ₂ O ₅ Of the solution	0.4 3	0.2	0.2	0.19	0.59	0.58	1.73	2.62	0.92	1.15
Calcium silicate (g)	120	100	150	60	100	150	200	140	240	310
Water (ml)	80	40			25	60	118	21	71	65
pH of the acid solution	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
pH of the solution after addition of the calcium silicate	1	0.5	1	0.5	0.5	1.5	1	1	1.5	1.5
Appearance of the mixture after the addition of the calcium silicate (LS, S-D, P)*	LS	LS	S-D	S-D	P	LS	LS	S-D	P	P

* : LS = Liquid suspension / S-D = Semi-dry / P = Pasty

10

In the process of the invention, the amount of calcium silicate added to the acid silica alumina phosphate solution is such that the weight ratio calcium silicate /

SiO₂ present in the acid solution is advantageously greater than 1, preferably greater than 1.5, most preferably greater than 2, for example comprised between 1 and 5, advantageously comprised between 1.5 and 3.5.

- 5 The binders 3 to 5 and 8 to 10, after their preparation, are mixed with water so as to have a more liquid appearance, whereby the addition of fibers and other particles is more adequate.

Examples of compositions of the invention

10

The binder n°2 which is liquid after its preparation was mixed with various additives and/or filler.

15 The following table gives the different additives and fillers used, expressed in part by weight, the binder being expressed as dry matter (without water).

Product n°	1	2	3	4	5	6
Binder (dry matter, part by weight)	1	1	1	1	1	1
RHF1	0.1	0.1			0.5	
RHF2		0.1				
RBCF1			0.2			0.4
RBC				0.3		
CAS					0.2	
SF	0.02	0.02	0.05	0.05	0.1	0.1
Sf						0.2

20 For the preparation of said compositions, water can be added for controlling the viscosity of the composition, said viscosity being preferably maintained as low as possible during the mixing step.

To said compositions, one or more further additives or fillers can be added.

- 5 The following table gives possible additives and fillers which can be added to the compositions of the above table. Said addition is carried out when the composition is sufficient liquid. Possibly some water is added before the addition and/or during the addition of said additives and fillers.

Examples of possible additive and filler added to one volume of a composition with a solid content of 25% and 50% by weight						
Additive (Part by volume)	H ₂ O ₂ 0.13	Silica Fume 0.42	Aluminum powder 0.12	Super Plasticizer 0.15	Ligno- Sulfonate 0.13	Quartz 0.54
Filler (part by volume)	Vermi- culite 0.33	Straw 3 parts	Fly ash 0.52	Chip 1.22	Flax Fiber 0.75	
Appearance of the product	Foam, low density	Low density	Foam Low density	Low density	Low density	Heavy density

WHAT I CLAIM IS :

- 5 1. A composition comprising at least :
- an inorganic binder having calcium silicate sites which are connected the one with the other by alumina-silica phosphate bonds, the calcium silicate sites acting as cross-linking sites for alumina-silica phosphate bonds with a weight ratio $\text{Al}_2\text{O}_3/\text{SiO}_2$ ranging advantageously from 0.3 : 1 and 10 : 1, preferably from 10 0.6 : 1 and 6 : 1, and
 - silicon containing fibers with a length of less than 1000 μm , the weight content of silicon containing fibers with a length of less than 1000 μm in the composition after its hardening and after removal of the possible free water being of at least 0.5%.
- 15 2. The composition of claim 1, which comprises silicon containing fibers with an average (in weight) length of less than 500 μm , the weight content of silicon containing fibers with an average length of less than 500 μm in the composition after its hardening and after removal of the possible free water being of at least 20 0.5%.
3. The composition of claim 1, which comprises silicon containing fibers with an average (in weight) length of more than 10 μm , advantageously of more than 20 μm , preferably comprised between 25 μm and 300 μm , most preferably between 50 μm 25 and 250 μm .
4. The composition of claim 1, in which the silicon containing fibers with a length of less than 1000 μm , advantageously with an average (in weight) length of less than 500 μm , are substantially not reactive with the binder.

5. The composition of claim 1, in which the silicon containing fibers with a length of less than 1000 μ m, advantageously with an average (in weight) length of less than 500 μ m, are not reactive with the binder.

5 6. The composition of claim 1, which, after hardening and removal of free water, comprises from 1% up to 75% by weight, advantageously from 2% up to 25% by weight, silicon containing fibers with a length of less than 1000 μ m, advantageously with an average (in weight) length of less than 500 μ m, are not reactive with the binder.

10 7. The composition of claim 1, which comprises silica flour with a particle size of less than 500 μ m, advantageously comprised between 2 and 400 μ m, the weight content of silica flour in the composition after its hardening and after removal of the possible free water being of at least 0.5%.

15 8. The composition of claim 1, which comprises silica flour with an average (in weight) particle size comprised between 2 and 100 μ m, advantageously between 5 and 60 μ m, preferably between 10 and 50 μ m, the weight content of silica flour in the composition after its hardening and after removal of the possible free water
20 being comprised between 1 and 10%, advantageously between 2 and 8%.

9. The composition of claim 1 or 7, which further comprises crystallized alumina silicate particles which are substantially not reactive with the binder and which have an average (in weight) particle size comprised between 5 and 100 μ m, the
25 weight content of crystallized alumina silicate in the composition after its hardening and after removal of the possible free water being comprised between 1 and 10%, advantageously between 2 and 8%.

10. The composition of claim 1, in which the weight ratio calcium silicate site /
30 SiO₂ present in the alumina-silica phosphate bonds is greater than 1, preferably greater than 1.5.

11. The composition of claim 1, in which the calcium silicate sites are calcium meta silicate sites having a substantially acicular nature with a length/diameter ratio from 2/1 to 50/1, advantageously from 3/1 to 20/1.

5 12. The composition of claim 11, in which the calcium meta silicate sites has an average length from 10 μ m to 10mm, advantageously from 50 μ m to 5 mm.

13. The composition of anyone of the preceding claims, in which the weight ratio calcium silicate sites/alumina-silica phosphate bonds is comprised between 0.1 and 10 1.1, advantageously between 0.3 and 0.9, preferably between 0.4 and 0.7.

14. A product made at least partly or associated at least partly to a hardened composition according to any one of the claims 1 to 13.

15 15. A kit for the preparation of a composition according to anyone of the claims 1 to 13, said kit comprising :

- a container of bag containing a water insoluble calcium silicate, silicon containing fibers with a length of less than 1000 μ m, and possibly, but 20 advantageously silica flour with an average particle size of less than 500 μ m, and
- one or more containers or bags containing compounds for preparing an acid alumina-silica phosphate solution or containing an alumina-silica phosphate solution, the pH of said solution measured at 20°C being less than 1.5, 25 advantageously less than 1, preferably less than 0.5, in which the silica is solubilized .

16. A process for the preparation of a composition according to anyone of the claims 1 to 13, in which a binding mixture is prepared by mixing water insoluble 30 calcium silicate particles with an acid alumina-silica phosphate solution at a temperature lower than 50°C, said acid alumina-silica phosphate solution comprising solubilized SiO₂ and having a pH less than 2, advantageously less than

1.5, preferably comprised between 0.5 and 1.5, said alumina-silica phosphate solution having a ratio $\text{Al}_2\text{O}_3/\text{SiO}_2$ ranging advantageously from 0.3 : 1 and 10 : 1, preferably from 0.6 : 1 and 6 : 1, in which silicon containing fibers with a length of less than 1000 μm are mixed with water insoluble calcium silicate particles, prior to
5 or during the mixing of water insoluble silicate particles with an acid alumina-silica phosphate solution and/or in which silicon containing fibers with a length of less than 1000 μm are mixed with the binding mixture before its complete hardening.

10 17. The process of claim 16, in which silica flour is added to the water insoluble calcium silicate particles, prior to or during the mixing of water insoluble silicate particles with an acid alumina-silica phosphate solution and/or to the binding mixture before its complete hardening, said addition being carried out prior, during or after the addition of silicon containing fibers.

15 18. The process of claim 16 or 17, in which the weight ratio water insoluble calcium silicate particles / solubilized SiO_2 present in the alumina-silica phosphate solution is greater than 1, preferably greater than 1.5.

20 19. The process of any one of the claims 16 to 18, in which the hardening of the binder is carried out at a temperature comprised between 0°C and 50°C.

20. The process of anyone of the claims 16 to 19, in which the composition is hardened under pressure.

25 21. The process of anyone of the claims 16 to 20, in which the amount of calcium silicate added to the acid silica alumina phosphate solution is such that the weight ratio calcium silicate / SiO_2 present in the acid solution is comprised between 1 and 5, advantageously comprised between 1.5 and 3.5.

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22. The process of claim 21, in which the amount of calcium silicate added to the acid silica alumina phosphate solution is such that the weight ratio calcium silicate / SiO_2 present in the acid solution is greater than 2.

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23. The process of claim 22, in which the silica used for the preparation of the acid silica alumina phosphate solution is precipitated silica.

ABSTRACTComposition comprising a Phosphate binder and its preparation

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Composition comprising at least :

- an inorganic binder having calcium silicate sites which are connected the one with the other by alumina-silica phosphate bounds, and
 - silicon containing fibers with a length of less than 1000 μ m, the weight content
- 10 of silicon containing fibers being of at least 0.5%